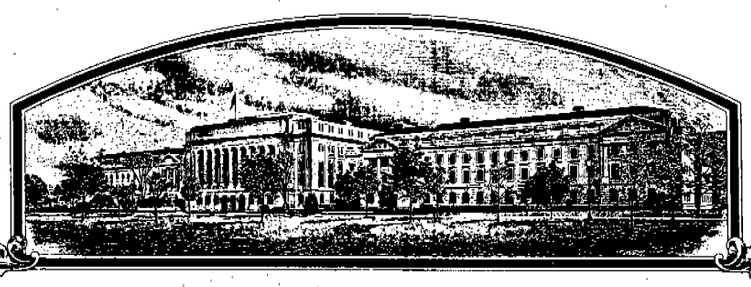


No. 7400109

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Nebraska Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF seventeen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW;*[THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM,]TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS REQUIRED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

* [Waived]

WHEAT

'Sentinel'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* 24th *day of* November *in the year of our Lord one thousand nine hundred and* seventy-five

Attest:

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Secretary of Agriculture

FORM GR-470
(12-15-72)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

FORM APPROVED
OMB NO. 40-R3712

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION	2. KIND NAME	FOR OFFICIAL USE ONLY
Sentinel (C.I. 17265)	Hard Red Winter Wheat	PV NUMBER 7400109
3. GENUS AND SPECIES NAME	4. FAMILY NAME *(Botanical)*	FILING DATE 6.10.74 / TIME 11 A.M.
Triticum aestivum L.	Gramineae	FEE RECEIVED $ 250.00 / BALANCE DUE $ —
	5. DATE OF DETERMINATION	$ 250.00 / $ —
	July, 1968	$ 250.00 / $ —

6. NAME OF APPLICANT(S)	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*	8. TELEPHONE AREA CODE AND NUMBER
Board of Regents University of Nebraska and Agricultural Research Service U.S. Department of Agriculture	Lincoln, Nebraska 68508 Washington, D. C.	402-472-7211 202-447-3656

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	10. STATE OF INCORPORATION	11. DATE OF INCORPORATION
Corporation and U. S. Government Agency	Nebraska Washington D. C.	

12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all papers:

Dr. Howard W. Ottoson, Director
Agricultural Experiment Station
University of Nebraska-Lincoln
Lincoln, Nebraska 68503

Dr. T. W. Edminster
Office of Administrator
USDA, Agricultural Research Service
Washington, D. C. 20250

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

[X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*

[X] 13B. Exhibit B, Botanical Description of the Variety

[X] 13C. Exhibit C, Objective Description of the Variety

[X] 13D. Exhibit D, Data Indicative of Novelty

[X] 13E. Exhibit E, Statement of the Basis of Applicant's Ownership

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed? *(See Section 83(a). (If "Yes," answer 14B and 14C below.)* [X] YES [ ] NO

14B. Does the applicant(s) specify that this variety be limited as to number of generations? [X] YES [ ] NO

14C. If "Yes," to 14B, how many generations of production beyond breeder seed? [X] FOUNDATION [X] REGISTERED [X] CERTIFIED

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes that the variety is distinct, uniform, and stable as required in Section 41 and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant is informed that false representation herein can jeopardize protection and result in penalties.

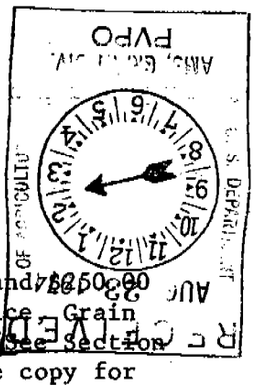
FOR THE BOARD OF REGENTS - UNIVERSITY OF NEBRASKA

June 4, 1974
(DATE)

(SIGNATURE OF APPLICANT)
Miles Tommeraasen, Vice Chancellor for Business & Finance

(DATE)

(SIGNATURE OF APPLICANT)



INSTRUCTIONS

GENERAL: Send an original copy of the application, exhibits and fee to U.S. Dept. of Agriculture, Agricultural Marketing Service, Grain Division, 6525 Belcrest Road, Hyattsville, Maryland 20782. (See Section 180.175 of the regulations and rules of practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

5 Insert the date the applicant determined that he had a new variety based on the definition in Section 41 (a) of the Act and decision is made to increase the seed.

13a First, give the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method. Second, give the details of subsequent stages of selection and multiplication. Third, indicate the type and frequency of variants during reproduction and multiplication and state how these variants may be identified. Fourth, provide evidence on stability.

13b First, give any special characteristics of the seed and of the plant as it passes through the seedling stage, flowering stage and the fruiting stage. Second, describe the mature plant and compare it with a similar commercial variety grown under the same conditions, and indicate the differences.

13c A supplemental form will be furnished by the PVPO to describe in detail a variety for each kind of seed.

13d Provide complete data indicative of novelty. Seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty may be submitted. Seeds submitted may be sterile.

13e Indicate whether applicant is the actual breeder, the employer of the breeder, the owner through purchase or inheritance, etc.

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EXHIBIT A

Origin and Breeding History of Sentinel

Pedigree: Scout/4/Kenya 58/Newthatch/2/Cheyenne/Tenmarq/Mediterranean/ Hope/3/Pawnee/Cheyenne

Date of Cross: Cross 62171, 1962

Place: Agronomy Department, Nebraska Agricultural Experiment Station, Lincoln, Nebraska

Breeding system: Mass-pedigree

The breeding history of Sentinel is summarized in Table 1. The decision to release NE68440 (C.I.17265) under the name SENTINEL was made by the Nebraska Agricultural Experiment Staiton on March 29, 1973. Public release of information on Sentinel as a variety occurred on June 15, 1973.* The release was cooperative with the North Central Region, Agricultural Research Service, U. S. Department of Agriculture.

Breeder seed of NE68440 was seeded in 1972 for production of foundation seed. At the same time 10 bushels of breeder seed were allocated to the Illinois Agricultural Experiment Station.

In 1973, the Nebraska Foundation Seed Division produced 821 bushels of foundation seed and 61 bushels of breeder seed. The foundation seed was allocated to Nebraska growers for production of registered seed in 1974 and the breeder seed was used for the production of foundation seed in 1974.

A tall plant type has been the most obvious variant in Sentinel during seed multiplication. The percentage of such offtype plants does not exceed 0.1 percent. Other offtype plants are very rare and Sentinel is as stable genetically as Scout 66.

* Release statement attached.

7400109

NEBRASKA AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF NEBRASKA-LINCOLN
AGRONOMY DEPARTMENT

SENTINEL HARD RED WINTER WHEAT

History:

Sentinel (C.I. 17265) is an increase of a single F_3 head selection from the 1962 cross, Scout/4/Kenya 58/Newthatch/2/Cheyenne/Tenmarq/Mediterranean/Hope/3/Pawnee/Cheyenne. It was increased and tested as NE68440 in Nebraska beginning in 1969 and in the Southern Regional Performance Nursery in 1972.

Contributions:

Sentinel was developed cooperatively by the Nebraska Agricultural Experiment Station and the North Central Region, Agricultural Research Service, U. S. Department of Agriculture. The development was supported in part by grants from the Division of Wheat Development, Marketing and Utilization, Nebraska Department of Agriculture. J. W. Schmidt, V. A. Johnson, A. F. Dreier, and P. J. Mattern of the Agronomy Department and G. Dornhoff, P. Nordquist, P. Grabouski, L. Nelson, and C. Fenster of the out-state stations identified the agronomic and quality characteristics of the variety. K. F. Finney, and J. A. Johnson and A. Ward, A. R. S. and Kansas State University, respectively, participated in the quality evaluation.

Recommendations:

Sentinel is suggested for production in areas of the Central, South Central and Southwest cropping districts where lodging has been a problem with the current varieties.

Description:

Sentinel is an awned, white-glumed variety. Beaks are moderately long.* Sentinel is three to four inches shorter than Scout 66 and has much better straw strength. It is similar to Scout in maturity or may be slightly later in heading. Sentinel has excellent stem-rust resistance. It is moderately susceptible to leaf rust and soil-borne mosaic and susceptible to Hessian fly. It appears to be similar to Scout 66 in winterhardiness. Under certain environmental conditions it may develop some brown necrosis on the spike and peduncle. Bread baking quality of Sentinel is very good. The variety appears to have above-average grain-protein content.

* Correction: Measurement data obtained from 1973 field planting show this to be incorrect. Beaks of Sentinel are moderately short.

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Seed Availability:

Production from 25 acres of foundation seed increase fields of Sentinel at Mead, Nebraska, will be available for distribution following harvest in 1973. Distribution of foundation seed to eligible certified growers will be by the Foundation Seed Division, University of Nebraska-Lincoln.

Seed Classes:

Seed classes of Sentinel designated by the Nebraska Agricultural Experiment Station are breeder, foundation, registered, and certified. Sentinel will be submitted for registration and variety protection under P. L. 91-577 with the certification option.

Variety Release Information:

Publicity on the release of Sentinel will be on June 15,1973.

Approved:

Chairman, Department of Agronomy — Date: 14 May 73

Chairman, Department of Entomology — Date: 5/15/73

Chairman, Department of Plant Pathology — Date: 5/16/73

Dean, College of Agriculture — Date: 22 May 73

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EXHIBIT B

Botanical Description of Sentinel

The botanical description of Sentinel is as follows: Plant winter-habit, early, blue-green foliage, waxy bloom; height short; stem white to yellow, mid-strong; spike awned, tapering, mid-dense, mostly erect; glumes glabrous, white to yellow, short and narrow; shoulders narrow and square to oblique; beaks mid-short and acuminate; awns white 5-9 cm long; kernels red, hard, short, ovate to elliptical; germ mid-sized; crease shallow; cheeks rounded; brush medium, not collared.

Sentinel is similar in field appearance to Scout and Homestead. It is considerably shorter in height than Scout but slightly taller than Homestead. Leaves are somewhat wider than those of Scout. It is nearly a day later in maturity. Like Scout and Homestead, it does not shatter easily.

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EXHIBIT C (additional data)

Table 2. Comparative data for winter wheat varieties at Mead, Nebraska, 1973. Ten observations for plant height and 50 observations for all other traits.

T Trait		Scout 66	Buckskin	HiPlains	Homestead	Sentinel
Height: cm.	Mean	109.8	112.2	101.0	87.9	90.1
	Range	103-114	105-116	90-108	80-95	84-94
Internode length: cm.	Mean	24.6	25.5	26.9	24.7	25.3
	Range	19-30	20-30	19-31	15-30	20-30
Leaf length: cm.	Mean	23.8	28.7	25.5	22.4	25.5
	Range	17-30	20-35	18-30	17-28	19-30
Leaf width: mm.	Mean	7.72	9.08	9.78	9.14	9.22
	Range	6-11	7-11	8-12	7-12	7-11
Head length: cm. (from 1st rachis node)	Mean	9.37	9.27	8.68	8.17	8.25
	Range	8.0-11.0	7.3-11.0	7.1-10.2	6.8-9.8	6.9-9.3
Head width: mm.	Mean	8.7	8.3	8.8	8.5	8.6
	Range	6-10	7-12	7-12	7-12	7-11
Awn length: cm.	Mean	7.78	7.61	7.37	7.42	6.95
	Range	5.4-10.0	5.3-9.4	4.6-9.3	5.5-9.5	4.9-9.2
Glume length: mm.	Mean	10.3	7.1	7.3	7.2	7.4
	Range	8-12	6-9	6-9	6-9	6-9
Glume width: mm.	Mean	3.9	2.7	3.0	3.1	3.3
	Range	3-5	2-4	2-4	2-4	3-4
Beak length: mm.	Mean	2.7	9.1	9.5	3.0	1.9
	Range	1-10	5-17	7-17	2-6	1-3

FORM APPROVED. OMB NO. 40-R3712

FORM GR-470-6
(2-15-73)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY

WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S): Board of Regents, University of Nebraska-and Agricultural Research Service, U.S. Dept. of Agriculture

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*): Lincoln, Nebraska 68503--Washington D. C. 20250

FOR OFFICIAL USE ONLY

PVPO NUMBER: 7400109

VARIETY NAME OR TEMPORARY DESIGNATION: Sentinel

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:

[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

[2] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____ [2] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

Meaningless for winterwheat

[ ][ ][ ] FIRST FLOWERING [ ][ ][ ] LAST FLOWERING

4. MATURITY (50% Flowering):

[ ][ ] NO. OF DAYS *EARLIER* THAN ..... [ ] 1 = ARTHUR 2 = SCOUT 3 = CHRIS

[0][1] NO. OF DAYS *LATER* THAN ..... [2] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (From soil level to top of head):

[0][9][0] CM. HIGH

[ ][ ] CM. TALLER THAN ..... [ ] 1 = ARTHUR 2 = SCOUT 3 = CHRIS

[2][0] CM. SHORTER THAN ..... [2] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (See reverse):

[3] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

8. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom: 1 = ABSENT 2 = PRESENT

[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[0][5] NO. OF NODES (*Originating from node above ground*)

[2][5] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[1] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

[2] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____

[1] Flag leaf: 1 = NOT TWISTED 2 = TWISTED

[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

[0][9] MM. LEAF WIDTH (*First leaf below flag leaf*)

[2][6] CM. LEAF LENGTH (*First leaf below flag leaf*):

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FORM GR-470-6 (REVERSE)

11. HEAD:

[3] Density: 1 = LAX 2 = DENSE **3. Middense**

[1] Shape: 1 = TAPERING 2 = STRAIGHT 3 = CLAVATE 4 = OTHER (Specify) _____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[2] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[0 8] CM. LENGTH

[0 9] MM. WIDTH

12. GLUMES AT MATURITY:

[1] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[1] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[1] **1 Glabrous** 2 Pubescent

[2] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE **Really square to oblique**

[3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[1] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[4] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL **4 = ovate to elliptical**

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[5] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[0 6] MM. LENGTH [0 3] MM. WIDTH [2 7] GM. PER 1000 SEEDS

17. SEED CREASE:

[ ] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[ ] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[2] STEM RUST (Races) _____

[1] LEAF RUST (Races) _____

[0] STRIPE RUST (Races) _____

[0] LOOSE SMUT

[0] POWDERY MILDEW

[0] BUNT

[1] OTHER (Specify) **Soil borne mosaic**

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY

[0] APHID (Bydv.)

[0] GREEN BUG

[ ] CEREAL LEAF BEETLE

[ ] OTHER (Specify) _____

HESSIAN FLY RACES: [1] GP [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Scout	Seed size	Lancer
Leaf size	Scout	Seed shape	Lancer
Leaf color	Scout	Coleoptile elongation	---
Leaf carriage	Scout	Seedling pigmentation	Scout

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. *(See attachment.)*

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

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Exhibit C (Additional data)

Table 3. Comparative kernel data for winter wheats grown in Nebraska in 1973. Means of five locations. Kernel length and width based on 25 kernel counts for each location.

Trait	Scout 66	Buckskin	HiPlains	Homestead	Sentinel
1000 kernel weight, grams	28.14	25.57	25.86	26.72	26.59
Kernel length: (length of 25 kernels, mm)	161.0	155.6	147.8	160.0	155.2
Kernel width: (width of 25 kernels, mm)	67.8	65.2	65.4	68.4	68.2

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EXHIBIT D

Data Indicative of Novelty of Sentinel

There is no one item that contributes novelty to the Sentinel variety. It is most similar to the Homestead variety. The features of Sentinel that provide distinctiveness and also separate it from Homestead are:

1. An awned hard red winter wheat that has

   a. Excellent field resistance to current stem rust races.

   b. Excellent seedling resistance to almost all of the current stem rust races (see table 4).

   c. Susceptibility to soil-borne mosaic as contrasted with the moderate resistance of Homestead (table 5).

   d. Low level of infection with powdery mildew (highest reading 2 on 0-9 scale).

   e. Susceptibility to leaf rust and Hessian fly.

   f. Moderately short stature with improved lodging resistance (see table 6).

2. A hard red winter wheat with

   a. Intermediate gluten dough handling properties (see table 7 and figures 1 and 2).

   b. Above average grain protein content (see table 8).

Sentinel is slightly taller and slightly later in maturity than Homestead and not so apt to show the head and peduncle melanism (pseudo-black chaff) associated with the Hope wheat type of stem rust resistance.

Table 4 Seedling Reaction of the 1974 Northern Regional Hard Red Winter Wheat Performance Nursery to *Puccinia graminis* f. sp. *tritici*.
(by D. V. McVey, Cereal Rust Laboratory, ARS, University of Minnesota, St. Paul, MN)

Entry No.	Variety or Cross	C.I. or Sel. No.	Source	Reaction Produced by Isolates												
				72-45-855C	70-44-64A	72-45-1079B	72-21-1184B	65-39-2	72-4-1A	72-14-504C	72-00-53A	71-21-584B	72-25-639C	72-44-703C	72-00-1370C	72-11-[illegible]
				MCB* 56	HFC	HJC 17	TBM 15	TLM	TNM 15B-2	RPL	RTQ	RHR 11-32-113	RKQ	QSH	QFB 151	QT
1.	Kharkof	CI 1442	check	S	R	R	S	S	S	R	R	S	R	I	R	I
2.	Warrior	CI 13190	check	S	S	S	S	S	S	S	S	S	S	I	I	I
3.	Pnc/3*Cnn/3/Ky58/Nth/2/2*Cnn/Tm/Mi/Hope/4/Sut	NE69441	Nebraska	R	R	R	R	R	R	R	R	R	R	R	R	R
4.	"	NE69442	"	R	R	R	R	R	R	R	R	R	R	R	R	R
5.	Warrior/Scout	NE70711	"	S	S	S	S	S	S	S,R	S	S	R	I	R	R
6.	" "	NE70712	"	S	S	S	S	S	S	S	S	S	S	I	R	I
7.	Hume/Nebr. Semidwarf Comp.	SD697	So. Dak.	S	R	R	R	R	R	R	R	R	R	S,R	R	R
8.	SS/D8//Wnt/4/Hume/3/SS/12500/Rch/Pn//Cnn	SD7216	" "	R	R	R	R	R	R	R	R	R	R	R	R	R
9.	"	SD7219	" "	R	S	S	S	R	S	S	R,S	S	S	I	I	I
10.	"	SD72134	" "	R	R	R	R	R	R	R	R	R	R	R	R	R
11.	"	SD72172	" "	R	R	S	R	R	R	R	R	S	R	R	R	I
12.	"	SD72175	" "	R	S	S	R	R	R	R	R	R	R	R	R	R
13.	"	SD72193	" "	R	R	R	R	R	R	R	R	R	R	R,S	R	R
14.	SS/D8//Wnt/3/Arr/III -54-12	SD7227	" "	R	R	R	R	I	I	R	R	S	S	R	R	R
15.	Yg*3/Cnn Sel. 2-3-13-6	MT6715	Montana	S	S	S	S	S	S	R	R	S	S,R	S	R,S	S
16.	BWH 1376-8/YTO 117, Sel. 1-3-2-1	MT6916	"	S	R,S	S	S	S	S	S	S	S	R	S	I	S
17.	Nb176/Y 18181//YTO 117, Sel. 1-1-4-3	MT6930	"	S	S,R	S	S	S	S	S	S	S	R	R	R	R
18.	Homestead	CI 17264	Nebraska	R	R	R	R	R	R	R	R	R	R	S	R	S
19.	Sentinel	CI 17265	"	R	R	R	R	R	R	R	R	R	R	S	R	S
20.	Buckskin	CI 17263	"	S	R,S	R	R	R	R	R	R	S	R	S	I	S
21.	Sage	KS70H179	Kansas	R	R	R	R	R	R	R	R	R	R	R	R	R
22.	Cloud	KS7016	"	R	R	R	R	R	R	R	R	R	R	R	R	R

*Cereal Rust Laboratory designation based upon 12 isogenic lines.

Table 5 . Field reaction to soil-borne mosaic virus for selected entries, 1972-73.

Variety	1972				1973			
	Newton, Ks Response	Powhattan, Ks Response	Urbana, Ill. % Incidence	Urbana, Ill. Severity 0-5	Newton, Ks Response	Powhattan, Ks Response	Urbana, Ill. % Incidence	Urbana, Ill. Severity 0-10
Pawnee	S	MS	40.0	3	S	S	50	6
Bison (Susc. Check)	S	MS	2.5	1	S	S	10	1(10% R)
Concho (Res. Check)	R	R	2.5	1	R	R	0	0
Homstead	R	R	20	3	R	R	0	0
Sentinel	S	MS-	50	3	MS-	S	30	7
Buckskin	MR	R-	60	2	MR-	S	10	5
HiPlain	S	MR	50	2.5	MS	S	0	0

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R 2 2 0 0 0 0 0 0 23 2- QCC 151 73-45-977B

Table 7 . Chemical, Milling, and Baking Data for some entries of the Kansas Intrastate Nursery Composites of Hard Winter Wheat Progenies Harvested in 1973.[1/]
Hard Winter Wheat Quality Research Unit, ARS, Manhattan, Kansas.

Variety	C.I. or Sel. No.	Wheat[2/]				Flour[2/]		Bread-baking Data[2/]						
		Wt./ Bu.	Ash	Protein	Flour yield	Ash	Protein	Absorption	Mixing time[3/] As Rec'd	Mixing time[3/] Corrected to	$KBrO_3$ Requirement	Crumb Grain	Loaf volume As Rec'd	Loaf volume Corrected to
		lbs.	%	%	%	%	%	%	min.	min.	mg.		cc.	cc.
									12.0% P					11.0% P
Parker	13285	62.0	1.67	12.1	72.8	.38	10.8	59.8	4-3/4	4-1/8	1	Q-S	789	802
Scout	13546	60.8	1.54	12.0	73.8	.40	10.9	59.4	3-3/8	2-7/8	2	S	845	852
HiPlains	NE68427	60.8	1.61	11.3	73.0	.41	10.4	59.7	4-3/4	3-7/8	1-2	S	846	890
Buckskin	NE68435	60.1	1.51	11.7	71.1	.39	10.7	60.9	6-1/8	5-1/8	0-1	S	864	886
Homestead	NE68437	60.3	1.58	12.5	73.8	.37	11.5	59.2	4-5/8	4-3/8	1-2	S	890	855
Sentinel	NE68440	60.0	1.58	12.4	72.2	.38	11.3	62.6	4-1/2	4-1/8	1	S	875	854

[1/] Chemical data expressed on a 14% moisture basis.

[2/] S, Q, and U - Satisfactory, questionable, and unsatisfactory quality with respect to properties in question. A satisfactory rating is inferred in the absence of a designated one. One unsatisfactory rating, in general, characterizes a variety as undesirable for hard wheat milling and breadmaking purposes. Crumb colors were satisfactory for all entries.

[3/] Mixing time used in baking is evaluated in conjunction with other mixing properties obtained from the 10-g. mixogram.

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Table 8 . Grain Protein content of selected varieties in Nebraska Outstate Tests.

Variety	Grain Protein %	
	1972	1973
Centurk	11.7	12.0
Scout 66	11.8	12.1
Scoutland	12.4	12.7
Homestead	12.2	12.9
Sentinel	12.3	13.0

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Fig. 1. Mixograms (10-g.) for the Kansas Intrastate Nursery composites of hard winter wheat progenies harvested in 1973. Hard Winter Wheat Quality Research Unit, ARS, Manhattan, Kansas.

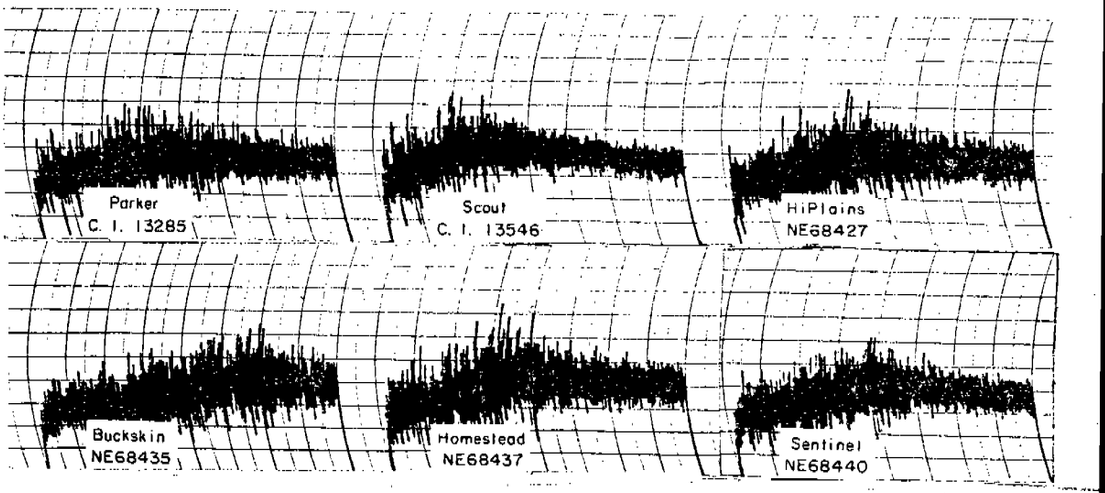

Figure 2. Representative mixograms for six Nebraska hard red winter wheats harvested in Nebraska in 1973.

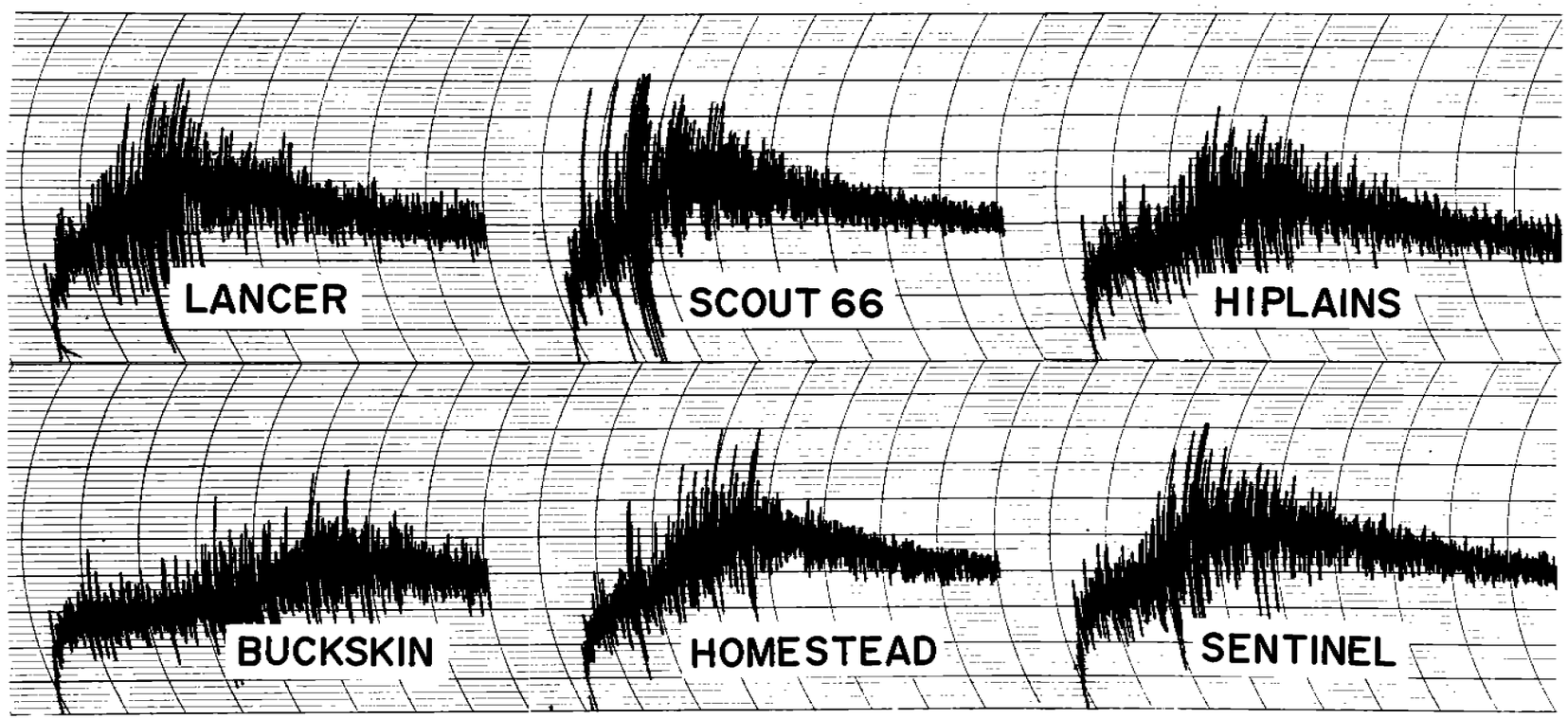

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EXHIBIT E

Statement of the Basis of the Applicant's Ownership

Sentinel Hard Red Winter Wheat is a product of the breeding program of the Nebraska Agricultural Experiment Station, University of Nebraska-Lincoln, Lincoln, Nebraska. The breeders were Dr. John W. Schmidt, and Dr. Virgil A. Johnson, employees of the Experiment Station (Department of Agronomy) and the Agricultural Research Service, USDA (stationed and functioning also as a staff member in the Department of Agronomy), respectively.

By established policy, release of varieties developed by the Nebraska Agricultural Experiment Station programs is the sole prerogative of the Experiment Station as the responsible agency providing the staff and funds for the breeding program.

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SUBJECT: Plant Variety Protection Certificates on Buckskin (C.I. 17263), Homestead (C.I. 17264), Sentinel (C.I. 17265), and HiPlains (C.I. 17262)

TO: Stanley F. Rollin, Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificates on the subject wheat varieties issue with the following notice on each Certificate:

> The right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is hereby waived.

FOR THE BOARD OF REGENTS - UNIVERSITY OF NEBRASKA

7/31/74
Date

Miles Tommeraasen, Vice Chancellor for
Business & Finance

FOR THE UNITED STATES DEPARTMENT OF AGRICULTURE

8/21/74
Date

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Table 5a. Infection type produced by isolates of wheat stem rust on selected commercial hard red winter wheats. (Adapted from data supplied by the Cereal Rust Laboratory, ARS, USDA, University of Minnesota, St. Paul, Minnesota).

Variety	59-14-19	70-44-64C	72-4-1A	70-11-98B	72-00-53A	72-00-1370C	72-44-703C	72-45-977B
CRL Race	MBC	HJC	TNM	RKQ	RTQ	QFB	QSH	QCC
Standard Race	56	17	15B-2	32	32	151	151	151
Gage	2-	2-	0;1,S	2	2	2-	2-	2-
Warrior	S	S	S	S	S	23	23	23
Scout 66	S	S	0;S	0;	0;	23	2	0
Homestead	0;	0;	0;	0;	0;	0;	S	0;
Sentinel	0;	2	0;	0;	0;	0;	S	0;
Buckskin	S	2	0;	0;	0;	23	S	0;
HiPlains	32	2-	0;1	0;	0;	0;	2-	0;
Centurk	0;	0;	0;	0;	0;	0;	S	0
Trapper	0;	0;	0;	S	S	0;	S	0;
Agent	2	2	2	2	2	2	2	2
Lancer	S	0;	S	S	0;1	23	S	R
Triumph	S	2	S	2	2	2	2	2

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Table 6 Southern Regional Performance Nursery data for selected entries, 1971-73 averages.

Variety	Yield Kg/ha	Days to head After Jan. 1	Plant height cm	Lodging 0-9 scale	Vol. Wt. Kg/hl
	(73 obs)	(61 obs)	(72 obs)	(19 obs)	(72 obs)
Scout 66	3208	138	95.0	2.90	77.5
Centurk	3305	139	90.3	2.13	76.4
Homestead	3131	138	84.0	1.47	76.1
Sentinel (1972-73 only)	3129	138.5	87.0	2.00	75.7
Buckskin	3231	138.7	96.3	1.33	76.6